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by Max F. Millikan
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EDITORS INTRODUCTION

BACK in 1951 when the Office of Research and Reports was just being set up, the then Assistant Director, Max F. Millikan, wrote a long paper for his staff on the functions and methods of economic intelligence. In it, he spelled out the reasons for ORR's existence, its major and minor tasks, and the methods by which these tasks might best be performed. The paper was, in effect, marching orders for a new organization as it embarked on its job.

We have here printed the greater part of Dr. Millikan's paper, without any substantial changes and without any attempt to bring it "up-to-date." Why? First of all, *not* because Dr. Millikan was the first AD/RR; and second, *not* because the paper was an official document defining ORR's operating principles. Indeed, recalling that *Studies in Intelligence* will publish only unofficial, individual contributions to basic intelligence doctrine, we are printing Dr. Millikan's paper in some sense despite these facts about its author and its original purpose. Our reason for publishing the paper is this: it is, we feel, a distinguished contribution to the study of intelligence analysis methodology. And its application is by no means limited to *economic* intelligence; the same order of analytic problems, the same problems of sources, extent of information, competing requirements, liaison and coordination arise in any intelligence activity. The same problem Dr. Millikan addresses, that of building authoritative knowledge out of fragmentary sources, is perhaps the central problem of the intelligence process as a whole.

There is no need to rehearse in detail Dr. Millikan's qualifications for tackling such problems. He was for several years a senior official of this Agency and is now Director of the Center for International Studies at M.I.T., an organization that has conducted important research on Soviet and World Communist affairs since its inception in 1951.

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[] paper complements Dr. Millikan's, on two levels. On the level of economic intelligence research, it gives a current view of the methods devised since 1951 for analyzing, in successive approximations to the complete picture, the Soviet economy; it is, thus, in effect, a case-study of the method of successive approximations described in broad terms by Dr. Millikan. On a more general level, [] paper provides a survey of the amazing diversity of research techniques available to the intelligence analyst and of the potentialities of overt (or, at least, easily obtainable) information — if only the analyst knows what to do with the resources available to him.

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[] joined this Agency in 1951 after a career in corporate and private research organizations. He possesses a unique combined competence in chemistry, mathematics, and languages and is fellow of more than a score of national and international professional associations. [] is, at present, Assistant to the Deputy Director/Intelligence (Planning).

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In this issue we also inaugurate a continuing feature, a Notes and Comments Department. We have received a number of letters on the first two issues — many, in themselves, substantial contributions to thinking about intelligence principles and methods. Of these, we here publish two, both on the subject of "capabilities" and responsive to the January issue of *Studies in Intelligence*. Maj. Gen. John A. Samford is Director of Intelligence, U. S. Air Force; []

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[] We are grateful to both for permitting us to publish their comments. And we very much hope that, as subsequent issues appear, we will keep on receiving your comments, criticisms, and suggestions — publishable or not. We would like to know what you think of the series.

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THE NATURE AND METHODS OF ECONOMIC INTELLIGENCE

by Max F. Millikan

I. Introduction — What Is Our Problem?

DURING the first half of 1951, ORR was engaged in taking an inventory of its ignorance concerning the economy of the Soviet Bloc. The main purpose of this inventory was to establish a basis for planning a program of basic research to which ORR should address itself. Such a program must spring from a clear conception of why the US Government needs foreign economic intelligence, what foreign economic intelligence is, what role ORR should play in the total economic intelligence effort, and how the peculiar character of the Soviet economy and of our information about it influences the methods that we use. This introduction is devoted to some comments on these four topics.

Why does the solution of our national security problems depend in part upon adequate foreign economic intelligence?

Foreign economic intelligence serves at least five purposes in the design of policies to preserve our national security. These five purposes, which should be kept continuously in mind in planning our economic research program, are as follows:

1. To estimate the magnitude of possible present or future military or other threats to ourselves and our allies. A potential enemy can undertake successfully only those military operations which its economy is capable of sustaining. In the very short run, its strength may be measured in terms of the manpower which it can mobilize and the stocks of finished weapons of war and military supplies which it has on hand.

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Increasingly in modern times, however, military potential for anything but the briefest campaigns has come to depend upon the total economic resources available to a nation, including those necessary to support the civilian economy as well as those necessary to produce and operate the instruments of war.

A clear picture of the magnitude of the present and possible future military or other threat is needed to guide us as to the over-all magnitude of the defense effort in which we must engage in order to preserve our freedoms in the event of war.

2. To estimate the *character* and *location* of possible present or future military or other threats. Decisions which the USSR or any other potential enemy make with regard to how they will allocate their resources limit what they can choose to do. If they elect to invest largely in military installations in the Far East, their potential for attack in Europe is correspondingly restricted. This is not a matter of judging their intentions but rather of seeing what limitations are placed on the courses of action open to them in the future by decisions which they make today about the allocation of their total resources.

A principal purpose of thus estimating the character of military or other threats with which we may possibly be faced is to guide us in designing our own defense effort so that it will protect us against real rather than imaginary dangers.

3. To assist us in estimating, within the range of the possible, the *intentions* of the USSR or any other potential enemy. The economic resources of the enemy and their present distribution permit him to select any of a range of possible or probable courses of action. Within this range certain economic events may furnish indications as to which alternatives the Soviets intend to pursue and where and when.

These indications of intentions may be very important in assisting us to adjust our defense preparations to meet the most probable dangers.

4. To help policy-makers decide what we can do to *reduce* possible or probable military or other threats by impairing an enemy's economic capabilities to carry them out. This includes

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measures that can be taken to weaken him in advance of hostilities and thus delay or prevent his decision to engage in them, as well as measures to weaken or destroy the economic basis of his military power should he choose to commit it in general war.

Economic intelligence can help in suggesting such measures, in estimating their effectiveness, and in forecasting the enemy's probable reaction to them.

5. To assist in estimating the probable development of the *relative* strengths of the East and West over the next few years if global hostilities are avoided. A major purpose of these comparisons is to guide US policy-makers. The preceding four objectives are concerned with steps which the United States can take to defend itself against actions of a hostile power. Equally important is the design of that political policy which will have the best chance of achieving our objectives without hostilities. Essential to the planning of such a policy is the most accurate estimate possible of the relative economic strengths of both sides. There are equally grave dangers in a serious underestimate and in a serious overestimate of future Soviet economic strength. Either will produce policies more likely to bring on war than will an accurate estimate. The evaluation of Soviet strength implicit in various of the proposals for US policy now being advanced in this country varies widely from great economic weaknesses to very considerable economic power. A prime goal of authoritative economic intelligence is to provide the information that will narrow the "guess area."

What is economic intelligence?

Briefly, economic intelligence is intelligence relating to the basic productive resources of an area or political unit, the goals and objectives which those in control of the resources wish them to serve, and the ways in which and the effectiveness with which these resources are in fact allocated in the service of these various goals. There are a number of confusions as to the nature and limits of economic intelligence which call for clarification.

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In the first place, there is sometimes a tendency to regard the whole of economic intelligence as encompassed in a mere inventory of available resources of labor, raw materials, and instruments of production. This inventory is a necessary part but only a part of the total economic problem. An inventory of resources by itself without an understanding of the goals which they are designed to serve or of the methods employed to allocate them in the service of those goals can tell us little about capabilities, vulnerabilities, or intentions. The Allied Powers have a total steel capacity which is more than four times as great as that of the Soviet Bloc, but such a comparison is highly misleading. For the United States to achieve its minimum goals, even in a time of crisis like the present, steel must be allocated to many uses which the Soviets regard as of low or negligible priority.

Furthermore, a modern economy is characterized by a highly complex web of interconnections among its various parts. The capacities of the economy may be limited less by the over-all availability of resources than by a failure to keep all the complex interrelations in balance. Thus tank production, for instance, may be limited not only by the availability of steel from which to manufacture the tanks but also by the steel available to make the rails and the freight cars necessary to carry steel from steel plants to tank plants, or, more remotely, by the steel required for the machinery necessary to mine the coal to operate the railroads. Thus economic intelligence must be as much concerned with the goals which resources are to serve, and the ways in which they are related to each other, as with the physical inventory of the resources themselves.

Another problem relates to where economic intelligence leaves off and political, military, and scientific intelligence begin. Since the social organism is a whole and these ways of dividing it are somewhat arbitrary analytic inventions, precise lines between the segments are impossible to draw. In very rough terms, scientific intelligence follows the progress abroad of new scientific ideas through the research and development phases. When these techniques and methods begin to be employed broadly in production, they become the

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province of economic intelligence. Military intelligence is concerned with the character and capacities of the military establishments of foreign countries and with foreign targets for our own military efforts. Where the character of the military establishment depends upon rates of production or where the target of our military effort is the economy of the potential enemy, the lines between military and economic become blurred. The output of final military equipment and the physical targets on which our military forces must concentrate are clearly a prime concern of military intelligence. On the other hand, economic analysis is required to portray the complex nexus of economic support on which military production depends and to pursue the economic chain reactions which might result from the destruction of particular producing facilities.

The overlapping between political and economic intelligence is even greater. One of the best ways of studying the goals which a collectivized state wishes its economy to serve is to examine the institutional machinery that it establishes to guide economic processes. Thus certain of the institutions of government, although in a sense political phenomena, may have profound economic significance. On the other hand, economic conditions are of course an important determinant of the attitudes, loyalties, and composition of politically important groups. In these borderline areas, it is the purpose and object of investigation rather than the disciplines employed that determine whether intelligence is properly to be termed economic or political.

A final point of importance which the analyst must keep in mind is that economic intelligence is not always the same thing as economic information. Even the most basic economic intelligence should always be produced in relation to the needs of some intelligence consumer. The Central Intelligence Agency is charged with producing foreign economic intelligence relating to the national security, and the consumers of its product are those US Government officials charged with guarding the national security. A vast amount of information — indeed, almost all information — about foreign economies may

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be relevant to national security problems, but it is not economic *intelligence* until its relevance to those problems is made clear. It is the function of intelligence not to pursue knowledge for its own sake but rather to throw light on the probable consequences of present or future action. Though the intelligence analyst is not a policy-maker, he must constantly strive to keep in mind the relevance of information to policy problems, which alone can transform information into intelligence.

What is the role of ORR in foreign economic intelligence?

Many US Government agencies are engaged in the production and collection of foreign economic intelligence. Therefore, we cannot determine our program of research on the basis of the foregoing statement of the purposes and nature of economic intelligence alone. We must also consider how our activities can be made to reinforce rather than to duplicate the great amount of work which others must carry on in the discharge of their own missions. Our recent survey of foreign economic intelligence throughout the US Government suggests a number of conclusions as to what the focus of our activities should be.

First, our survey revealed that one of the most urgent needs of the Government is for some central spot where all the economic intelligence collected and produced throughout the Government can be brought together and focused on national security issues. In recognition of this need the National Security Council has directed that the Central Intelligence Agency shall perform this coordinating function. Although this paper is directed at our production program, our plans for intelligence production within ORR must take full account of these coordinating responsibilities which go along with our substantive effort.

A second conclusion of our survey has been that the area most in need of substantial additional economic intelligence effort is the Soviet Bloc. This is partly because the Iron Curtain has made access to Soviet economic intelligence more difficult, partly because the Soviet economic potential is perhaps the

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most critical key to our national security, and partly because, for a variety of reasons, the economic potential of other areas crucial for our national security, such as Western Europe, has been much more extensively studied. The mature economies of Western Europe have long been an object of study by both academic and governmental economists. The European Recovery Program has stimulated intensive analysis of the characteristics, needs, and prospects of the Marshall Plan countries. Thus, the economic research effort in man-hours directed at the USSR and its Satellites has been vastly less than that applied to Western Europe, although, because of the Iron Curtain, the effort required to produce comparable understanding is many times greater. For these reasons, we have concluded that the principal effort of ORR in intelligence production must be focused for the immediate future on the economic problems of the Soviet Bloc.*

We began this research effort with an inventory of our knowledge of the USSR itself. This, of course, is only a part of the problem. The economies of the European Satellites, whose analysis was our second task, are likewise crucial to the Soviet economic potential. Recent events have highlighted the importance of China to our estimates of Soviet strength and intentions. A final source of Soviet strength, which must be another object of our efforts, is the resources that the USSR could draw upon either now or as a consequence of future developments outside the present boundaries of the Bloc.

A final weakness of the intelligence effort as revealed by our inventory is that the demands which have been placed on the limited number of analysts working on the Soviet economy have been so frequent and insistent that analysts have had little or no time to do the basic research necessary to supply answers in a confident and authoritative form. If our effort is to be useful at all, it must be on a sufficient scale and of

* The Soviet Bloc excludes Yugoslavia and Finland and includes the European Satellites (East Germany, East Austria, Poland, Czechoslovakia, Rumania, Hungary, Bulgaria, and Albania) and the Eastern Satellites (Communist China and Communist Korea).

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sufficient depth to provide a much firmer factual foundation for the estimating process than economic intelligence has been able to produce in the past.

**Peculiarities of economic intelligence concerning
the Soviet Bloc**

There are a number of special characteristics of the Soviet economic intelligence problem which shape in important ways the methods that can be used to study it. These are not, however, all characteristics which make the problem more difficult than that of other areas. We may consider first some of the things about the Soviet economy which simplify our problem and then look at some of the factors which make it difficult.

The fact that the Soviet economy is centrally planned to achieve the goals of a small group of men acting collectively facilitates analysis enormously. In the free economy of the United States the tastes and desires of 160 million different unpredictable people all have an influence on what in fact occurs. The behavior of major sectors of the economy is greatly affected by the individual plans of countless consumers, each with a different and somewhat unpredictable quantitative weight. In the USSR there is one set of plans which dominates all others. Thus it is only by inadvertence that anything can occur which, from the point of view of the master plan, is irrelevant or unimportant. This makes the second job of economic intelligence described above — namely, the elucidation of the goals and objectives which those in control of resources wish them to serve — a great deal easier. Almost anything that happens can give us some clue.

A related point, true to some extent of every economy but especially true of the Soviet, is that everything depends on everything else. The interconnectedness of the economy and its subservience to the master plan mean that there are many different ways in which an economic fact can be ascertained. Steel production can be estimated directly from evidence as to the location and capacity of steel mills or indirectly from evidence of the manpower employed and of the iron ore or coal

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or alloy metals or other inputs available, from the total output of all the products made with steel, or from the capacities of transportation facilities serving the steel industry. The lack of direct evidence on some of the things that we most want to know, as revealed in the results of our inventory of ignorance, emphasizes the very great importance of giving priority to the interrelations of the parts of the economy. Thus the third task of economic intelligence, to explain all the complex ways in which resources are in fact allocated to various uses, is peculiarly essential to building a consistent picture of the Soviet economy.

A third fact that shapes our methods is that technology and the laws of nature are no respecters of iron curtains. The Soviets do many things differently from the way in which we do them, but in many other things they have no choice but to follow the only industrial technique that exists. Thus the electrolytic process which produces sodium hydroxide and chlorine inevitably produces them in the same ratio in the USSR as in the United States. We can learn many of the technical limitations on what they are able to do from a study of US industrial practices. But this must be done with care, since we know that in some cases the Soviets appear to be incapable of applying our techniques even where they know about them, whereas in other cases they have devised superior methods. Nevertheless, with appropriate caution, useful first approximations can be reached by the comparative method.

One implication of this for research plans is that there must be present in our work a much heavier dose of technical and engineering thinking than is customary in economic studies.

A characteristic which has advantages and disadvantages is that prices, markets, and money flows, the stock in trade of much economic analysis, have limited meaning in the USSR. We are spared the uncertainties of the capitalist business cycle, and monetary dislocations are of little significance. On the other hand, we are largely denied the benefits of money as a common measure of otherwise incommensurable activities. Most of our thinking must be not in terms of rubles but of tons and bushels and bales, of numbers of machines of innumerable

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different kinds, of car-miles, kilowatts per hour, and the like. To add all these things up to an index of capabilities, we must concoct our own common measuring rod, a task of no small complexity.

On the negative side is the obvious fact that information currently coming out of the Soviet Bloc is very limited indeed. This does not mean, however, as is sometimes concluded, that our knowledge is inevitably correspondingly limited. Radical economic changes do not occur overnight even in the USSR, and information on earlier periods is a good deal more abundant. Piecing this together with what we are getting now, exercising some ingenuity in making inferences from the known about the unknown (through the interrelations of the economy), and directing the collection of crucial missing pieces of information through the channels available to us, it is possible to put together a surprisingly reliable picture. What the scarcity of current information means is not that we are condemned to ignorance about the Soviet economy but rather that to find out what we need to know takes a great many more hours of painstaking research, of imaginative interpretation, and of fitting and adjusting than would be necessary in the study of an open economy. The documentation of this conclusion is to be found in the estimates of research time required which were compiled by the various divisions during the course of the inventory.

A final characteristic of the Soviet problem is that because of the costs and difficulties of collecting information, much more time and thought must be devoted to determining what pieces of additional information would be most revealing if we could secure them. This point should not be overemphasized. As the inventory discloses, the information required to give the answers that we need about a good many subjects is believed to be largely available in Washington. In those cases, what is needed is principally much more intensive mining of a rather low-grade ore. In other cases, however, field collection appears to be the only way of filling in certain critical gaps. In studying an open economy one would normally ask for much more information than one expected to use and

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then sort out the useful parts when it came. When the cost of information in money and lives is high, however, much more careful consideration must be given to which pieces of information are the vital ones. One of the principal responsibilities of ORR is to give this kind of guidance to the information collecting agencies.

The considerations set forth in this introduction do not determine the details of our research program or of our method of tackling it, but they do provide a framework of ideas within which the research program may be carried forward. The next task is to spell out method and content somewhat more precisely.

II. General Methods — How Shall We Go About It?

The dilemma of the clamorous customer versus the basic study

The central question of how we should allocate our time has already been referred to. The problems to whose solution we are asked to contribute are very urgent. Events will not wait for the orderly, patient, exhaustive research which alone can give satisfactory answers to these problems. If we were to devote ourselves exclusively to amassing all the facts we need, we would have to tell harried policy-makers that we would be glad to advise them — beginning in about 2 years. We neither should nor can stay in an ivory tower that long. Even if it were possible to devote ourselves exclusively to exhaustive and encyclopedic studies for the next 24 months, it is highly likely that at the end of that period many of the problems that we would be asked to help with would have changed so that our results would no longer be particularly applicable.

On the other hand, if we succumb completely to the very real pressure upon us to answer all current requests for prompt information, we will never have any information better than the slim fragments that we can now supply. Thus our dilemma is, in a sense, whether to be encyclopedic and irrelevant or operational and incompetent.

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Clearly the only tolerable solution is a compromise between these two extremes. We must try to answer the most important of the problems put to us from day to day as quickly and as competently as possible. But we must reserve a major part of our energies for improving the foundation of knowledge from which better quick answers can be given.

The necessity for this compromise has two further implications. The first is that it is possible to pursue this twofold objective only if we have a certain minimum of research resources substantially larger than that which the US Government has allocated to these problems in the past.

The other implication of our compromise is that since we cannot hope to have enough resources fully to exploit all the available information about the USSR, we must be very sure that we use our scarce research resources to fill in those areas of our ignorance which most seriously limit our estimating ability. We must concentrate our scarce manpower on finding out those things that the US Government needs to know most. The identification of these priority areas is one of the most puzzling problems facing intelligence.

How do we determine basic research priorities?

The most seductive answer to this question is contained in what we may call the "bottleneck fallacy." Since economic warfare, cold or hot, was first thought of, economists have sought for the bottleneck, the single critical item, the key facility without which the enemy's military economy would collapse. The history of the search for such bottlenecks is a record of failure, confirming the economist's faith, that, given a little time, resources are highly substitutable one for another. This does not mean that economic warfare is bound to be ineffective. On the contrary, the very fact that resources are interchangeable means that to deny an enemy any resource is to weaken directly or indirectly his military potential. This is particularly true in an economy which, like the Soviet, has for years been directed toward a single set of goals. Any economic activity recognized by the Kremlin as not essential

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to these goals would have been abandoned long since. Thus wherever we make an economic attack upon the USSR, it is likely to hurt. But it is a delusion to expect that a limited attack upon a small segment of the Soviet economy will cripple Soviet strength. It is not the capacity of a particular facility or the availability of a particular commodity which ultimately limits the capabilities of the Soviets so much as their total resources and their ability to organize them effectively.

This does not mean that all things are equally important. The selection of the more critical commodities and industries is one way of cutting the problem down to size. But when one has done all the pruning possible, the number of critical sectors of the economy remains too great to tackle them all exhaustively at once.

A second method of determining priorities for research is to see what basic research would be most relevant to the problems to which we are being asked to give current answers now. The dangers in this problem-approach to priorities are obvious. It leads one always to concentrate one's research on yesterday's rather than on tomorrow's problems. Basic research, by definition, takes time. The problems which may be urgent when the basic research that we start today is finished cannot be clearly foreseen and are almost certain to be different from those which are plaguing us now.

Furthermore, any attempt to list even the most urgent of the problems facing us at the moment reveals how many there are and how much of the total world economic picture is relevant to their solution. As part of our study of foreign economic intelligence for the National Security Council, the Central Intelligence Agency attempted to outline the requirements for such intelligence in terms of current problems. A very incomplete sample yielded a list of 42 top priority problems, some of them as broad as the total military potential of the USSR.

Again, we cannot wholly discard this criterion. We must try to foresee tomorrow's problems and guide our research accordingly. There are some aspects of the Soviet economy

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which we can take the risk of neglecting. But we must do a broad enough job to hedge ourselves somewhat against the errors in our own forecasting.

A third possibility is to take some aspect of the study of each commodity and concentrate on that aspect alone for all commodities across the board. Thus one could take some section of the Outline for a Basic Commodity Study used in the preparation of the inventory and fill in that section for every item first, leaving other sections until later. One could devote the entire energies of ORR to the study of requirements, for example, or to techniques and methods of production, or to the organization and plans for each industry, or to levels of output, or to some other aspect.

This principle of selection is almost certain to be unsatisfactory by itself, since the answers to most of the questions which policy-makers are going to ask involve putting together all of the parts of a basic study to get at the conclusion. Thus an estimate of capabilities requires an estimate of the balance between supplies and requirements to achieve whatever may be the goals and plans of the Soviet rulers. An estimate of vulnerabilities involves a knowledge of the availability of materials at present production rates and also an estimate of how goals and plans would be affected if that availability were to be cut by our action to a point far below requirements. If the design of a basic study is properly drawn, information about all the parts of that study is required to arrive at conclusions, and no single part can be left out entirely if satisfactory conclusions are to be reached.

The investigation of each of these methods of determining priorities on our research time leads us back to the unacceptable conclusion with which we started — namely, that the encyclopedic and exhaustive analysis of most of the parts of the whole economy is the only way in which we can arrive at sound and authoritative answers to the questions that are being asked. But we have already determined that we do not have the time or the resources to carry through this number of systematic basic studies from beginning to end. How, then, can we resolve this puzzling dilemma?

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The answer is suggested by looking at the present state of our knowledge. What we have just proved is that we need to know something about most aspects of most sectors of the Soviet economy to make a sensible estimate of capabilities, vulnerabilities, or intentions. But we have not proved that we must know everything about every aspect. What we already know permits us to set certain outer limits to the area of the possible. We know the Soviet Union is *at least* capable of certain minimum actions, and we can set certain ceilings on what they are *at most* capable of. Our problem is to bring the "at least" and the "at most" closer and closer together. This calls for a research program guided by what we may call the *Method of Successive Approximations*.

The Method of Successive Approximations

The first step in the Method of Successive Approximations is to lay out in general terms the specifications of what you would like to know. What is the list of all the significant industries, commodities, and services which should be studied, and what are the principal problems about them which we would like to solve? This was the first assignment in our inventory and resulted in the outlines produced as a guide to it.

The second step is to see how much of the outline you can fill in and with what degree of precision. This will reveal that our information about some aspects of each of our problems is better than our information about other aspects. It may not be very good. The best information that we possess may have a very wide margin of error, but other parts of our outline will be still weaker. Our inventory was designed to bring us through this second state — to tell us what we know and what we do not know about each of our major problems with respect to the USSR. It has revealed what it was intended to show — namely, that our ignorance of certain important matters is much greater than our ignorance of others.

The third stage of our Method of Successive Approximations is to concentrate our most earnest efforts for a brief period on the important parts of our problem which we know least

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about. This does not mean that we seek authoritative or final answers in these areas of ignorance but merely that we focus on them until our knowledge is brought up to a level equal to or somewhat better than our knowledge of the other parts of the picture.

When we have been working in this manner on weak spots for a period of 2 or 3 or 4 months, we must stand off and take another look at where we are then in relation to the total outline. The weak spots may still be weaker than anything else, or we may have gone far enough with them so that, although we still do not know much about them, they will be in better shape than what formerly was our best evidence. If our second over-all look reveals this to be the case, we must tackle whatever other sectors of our problem are now the weakest, not again with the notion that we are going to find out everything about them, but only that we are going to work on them until our ignorance of some other matter requires more pressing attention. In this business, knowing a little about a great many things is likely to be more helpful than knowing everything about a very few things and nothing about others. Each substantial drive to cover an area of ignorance must be intensive enough and substantial enough to permit us to make real progress toward solutions and not merely to hold our own. On the other hand, it must not be pursued with such perfectionist zeal that we neglect other areas in which our ignorance may be only slightly less serious.

In summary, the Method of Successive Approximations involves a repeated cycle of review and examination, planning, and several months' production followed by another review in the light both of progress and of changes in the character of the problems to be solved.

Problems in applying the Method

In attempting to apply the Method of Successive Approximations, certain common problems and difficulties arise which are worth a brief comment.

A particularly bothersome problem is that the things which we know least about, and thus the things which it is most

important to study, are likely to be the things on which we have least information. In general, we know more about rates of production of important commodities and products in the Soviet Union than we do about patterns of distribution of those products. This is partly because much more evidence is available on rates of production. The temptation is to study the material that we have and draw such generalizations from it as it seems to contain.

In terms of getting answers to our vital problems, however, we cannot permit the available evidence to dictate the nature of our inquiry too completely. Several weeks spent searching for every possible way to button down an illusive fact by ingenious reasoning from other related facts, by working out limits on what its magnitude could possibly be from what we know about other parts of the economy, or by laying on collection requirements may be worth many times the same amount of time devoted to extracting, setting down, and presenting all the facts that may happen to be in a given body of documents.

Both methods must be employed. Until we have systematically examined the available material, we do not know what can be got out of it. But the material available was not designed to answer our questions, and it must be made to be the servant of our investigation and not its master.

An irritating feature of the Method of Successive Approximations is that it may well involve us in going over the same material several times in search of the answers to a series of different questions. This repetition is unfortunate and can be avoided to some extent by investing some time in indexing and abstracting. If, however, we examine exhaustively all the material available to us for every implication that it contains the first time we study it, we will not complete our investigation for many, many months. It is unfortunate that research by the Method of Successive Approximations involves some waste and some repetition, but it is better than being able to produce no answers until 1954.*

* Editors Note: It is worth reminding the reader that this paper was prepared in 1951.

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The natural instinct of the researcher who has plenty of time is to follow the logical process of trying to build up a picture of a whole sector of the economy by first getting an idea of each of its smaller component parts. Thus the logical way to estimate the value of resources used in chemical production is to find out what resources are used in the production of each of the many different kinds of chemicals. Again this logically involves breaking each particular chemical into the quantities produced in each specific plant. This suggests that the first step in answering the over-all question is to try to identify all the physical producing facilities and their capacities and rates of operation. In many cases, however, a first approximation to the aggregate figure can be achieved by short cuts which avoid the necessity of knowing what in detail it is made up of.

Thus one can start, for example, with total resources engaged in chemical production in the United States, or in the war economy of Nazi Germany, as a proportion of total resources. One can then consider known respects in which the proportion in the USSR must deviate from these examples. Soap is rare in the USSR, and every household does not have its DDT spray. Such estimates of the whole before you know the parts usually have wide margins of error, but when current problems are pressing, they are frequently better than nothing at all.

Finally, for this Method to be effective, it should ideally be applied not simply to ORR's schedule of research production but to that of the US Government as a whole. Our delineation of areas of ignorance should be on a government-wide basis, and our production to remedy these weaknesses should be planned in collaboration with other agencies so that we do not all concentrate on the same gaps at once. As the coordinating part of our activities progresses, it should be closely integrated with our production so that the Government as a whole may approach more rapidly an adequate understanding of the Soviet economy.

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ECONOMIC INTELLIGENCE

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THE first order of business is to identify the problem of economic intelligence. It is a problem very like that of the college economics professor in the classic story about the examination papers that, year after year, ask the same questions. The punch-line hardly needs repeating: "in economics, we never change the questions, only the answers."

This is the problem of economic intelligence. We in the intelligence profession have the questions, which remain reasonably constant. It is the answers we have to change. Through a process of refinement, through successive approximations, we hope to approach the true picture of the outlook in the economic sector of the various nations we are called on to study.

Perhaps the best way to treat the subject of economic intelligence is to borrow the journalistic breakdown into the five W's and the H: "who," "when," "why," "what," "where," and "how." The first question is *what* — *what* is economic intelligence? It is the appraisal of the capability of a nation to support a war. This is, to be sure, a simplified definition, but it covers almost every important aspect of the activity.

The "Why" of Economic Intelligence

The second question is *why* — *why* do we prepare economic intelligence? We prepare it because we now recognize that

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many of the operations undertaken during World War II were not successful, or were unnecessarily delayed, owing to the lack of sound economic intelligence. Consider, for example, a speech made by General George C. Marshall on 9 September 1939, just a week after the war started. He said:

The true philosophy of the maximum war effort of any nation is for it to devote as much manpower and as much supply power as the nation can support. I suspect that Germany is now pursuing the very philosophy I have just outlined. For some years now she has been devoting over 50 per cent of the productive effort of her country, including men, plants, and materials, for the preparation of war, and now actual war. So it follows that she is now geared up to her maximum effort.

It is important to note, however, that she was not able to reach this status overnight. It has taken her some four or five years of intensive effort to develop the raw-material capacity to support her maximum effort. It is now generally accepted as a fact that it requires far more time to mobilize the industrial effort of a nation to the war load than it does to convert civilian manpower into soldiers.

This man was Chief of Staff of the US Army. He was alleged to be the best informed man in the country on the capability of the potential enemy, and he said that Germany was then, in September 1939, geared to its maximum effort. The Strategic Bombing Survey conducted after the war indicated that from 1939 to 1944, in the fields of explosives, tanks, and aircraft, German capabilities increased six times. The over-all increase of the German economy was two to three times. The British, with a 200-year tradition of intelligence research behind them, said at the end of each war-year, "Germany has now reached her peak." And during every successive year, that peak was surpassed.

This, then, illustrates the *why* of organized economic intelligence research. Since the war such great soldiers as Field Marshal Montgomery have listed the essentials for national

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security, based on their experience. Montgomery, in August 1947, said he believed these essentials were:

1. Strong national character.
2. Great development of scientific and industrial research.
3. Powerful and well-disciplined industrial power.
4. A regular army.
5. Preparedness.

Three of these five essentials are economic intelligence targets: "great development of scientific and industrial research" (we have to know what intentions and capabilities may be for the future), "powerful and well-disciplined industrial power," and "preparedness" (both of these fall into the category of economic intelligence).

Economic intelligence is, in sum, the appraisal of the capability of a nation to support a war, also an estimate of its vulnerabilities and of its intentions. Economic intelligence is, indeed, probably the best long-range indicator we have of intentions. On the vulnerability side, the intelligence community must have, necessarily, a consideration of *exploitable* vulnerabilities — a vulnerability is unimportant unless it can be exploited.

"When," "Where," and "Who"

When is economic intelligence produced? It is produced for both current and future use. The field of economics, broad as it is, requires an intensive study, sector by sector, in any given country to determine the aggregate of its economic potential. Furthermore, economic intelligence depreciates at a constant rate of, roughly, 20 per cent a year. At the end of six years' time, a piece of economic intelligence developed from data published this year will be worth only 35 per cent of its present value.

The intelligence community is charged, then, with keeping current on economic developments within the countries under study. These efforts are by no means confined to the study

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of the economies of the Soviet-dominated world. It is equally important that we be equipped to understand the capabilities of our friends and alleged friends.

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Where is this economic intelligence prepared? Part of it is prepared in CIA. Part, in the Department of State. The military contributes. In National Security Council Directive No. 15, which has been interpreted by the Director of CIA as DCID 15/1, responsibility for economic intelligence research is allocated to the various agencies. The Department of State deals with broad-gauge economic policy problems. CIA confines itself to the Soviet Bloc and the peripheral areas which may contribute to Soviet capabilities. The military components contribute all the military-economic intelligence that is so necessary to the proper understanding of the capabilities and intentions of a potential enemy or friend. The interpretations placed on the happenings of the day are contributed across-the-board, by all people who are competent to make such contributions. Consequently, no single organization can (or, indeed, does) operate *in vacuo* to produce economic intelligence. It is far too important a subject to trust to a single organization or a single individual.

Techniques and Methods of Economic Intelligence Production

The next question is the one I will treat at greatest length: *how* is economic intelligence produced?

The chart (Economy of the USSR)* purports to analyze only the economy of the USSR and most of the illustrations I will use are drawn from studies of the USSR. The application of the techniques and methods discussed, however, is as broad as the subject matter of economic intelligence. I will discuss

* This chart was devised by my good friend [redacted] of ORR.—
Author's Note.

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the methods that have been developed for answering the questions put to the intelligence community by policy-makers and also the sources of information drawn upon.

The chart, furthermore, breaks down economic analysis into five major subquestions. The first is that of quantitative analysis; the second and third deal with qualitative analysis; the fourth deals with the organization of the economy, and the fifth subquestion, with the growth of the economy.

A number of techniques are available to quantitative analysis. First of all, there are the statistics published by the country in question. In the case of the USSR, the statistics are, by and large and with the qualifications discussed below, good. Intelligence agencies have carefully analyzed these statistics, both for their internal consistency and for their external influence on the operations of the countries within the Soviet Bloc. The consistency of components within an aggregate can easily be checked against announcements of future changes in the aggregate itself as well as changes of individual components. The consistency of data on all levels, including estimates of changes in the physical productive capacity and the commodity outputs within the Soviet Bloc, has been verified for a sufficient number of cases to convince us that the Russians are not attempting, in general, to distort their published statistics.

Having said this, let me give a few examples of precisely the opposite — cases where the Russians have indeed distorted, or where interpretation is necessary to understand properly the statistical analyses made by the Soviet Central Statistical Bureau. A Soviet rubber-producing plant turns out both rubber tires and rubber heels. An announcement came out of this plant saying that the goal for tires had been missed by 50 per cent but that the goal for heels had been exceeded by 50 per cent — which, according to the Russians, meant that the overall production goal was met by 100 per cent!

Another example comes from the humor magazine, *Krokodil*. A cartoon appeared in this journal, some time back, which showed the manager of a machine tractor station standing on

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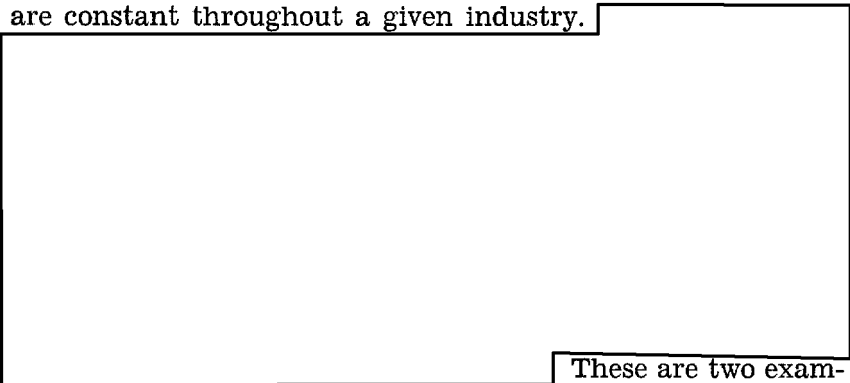
the porch sending off a deputy to the local commissar with the admonition: "Don't forget to tell him that half the plan is 100 per cent fulfilled."

All of which demonstrates that Soviet statistics need careful analysis. They cannot be accepted completely on face value. But by such analysis, and by careful review of the aggregates that we are able from time to time to accumulate, we have come to the conclusion that the statistics are, by and large, valid.

Input Analysis

A second tool of quantitative analysis is the method of inputs. There are certain basic relations, that is to say, that are constant throughout a given industry.

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These are two examples of how factors can be developed so that, given a bit of information collected by an observer in the USSR on some plant or industry, one can by deduction determine the approximate production capacity of that plant or industry.

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Input-Output Analysis

A system of input-output analysis — or, inter-sectoral analysis — is useful for quantitative estimation, because it shows the changes that can occur within an economy for any given stimulus. Take, for example, an input-output matrix for the Soviet petroleum industry (plotting products on the vertical side and industry on the horizontal): the agricultural sector within the USSR uses 23 per cent of total petroleum output; energy production uses 12 per cent; manufacturing, 11 per cent; transportation, 24 per cent; household uses, nine per cent; and the military, eight per cent. This adds up to 87 per cent. The other 13 per cent is that bit of petroleum the Russians have been using for barter with the West for scarce and necessary machine tools.

Input-output on electric power is another useful illustration of this technique of analysis. In their current plan, the Russians hope to have 170 billion kilowatt hours of electricity production a year, which would require 83 million tons of coal to produce. For each kwh, 1.2 pounds of coal are required. If the USSR decides it is going to have, say, more aluminum and will therefore have to increase its power requirement to 200 billion kwh, 95 million tons of coal will also be required. This new coal requirement of 12 million tons must now come from new mining activity or must be reallocated within the present consumption pattern.

As one further example of input-output analysis, consider a changeover in a given Soviet *oblast* from horse-drawn agricultural equipment to tractors. This sounds, at first, like a simple transformation; but, to increase requirements for tractors means much more than just an increase in tractor production; it means, as well, an increase in steel production, in electric power production, and in electronic control; and it means an increased demand for management and skilled labor. The reduced requirement for horses, on the other hand, will mean among other things a larger food supply for the people. It is just this sort of complex economic interrelationship that input-output analysis can help to clarify.

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In sum, the development of a matrix of input-output will show the implication of any change within any sector of the economy for any given product field that appears within the matrix. This type of analysis can be extended and refined as far as the matrix can be manipulated; at present we have a matrix which will take 61 items in the vertical columns and 61 items in the horizontal rows; this may be built up, at some time in the future, to as large a matrix as 1000 x 1000. This would require electronic calculators. To handle even the 61 x 61 matrix requires a good deal of calculation and a good many man-hours.

GNP and Industrial Production

The gross national product (GNP), which is an aggregate in money units of the total value of the goods and services produced in a given economy in a given time period, is an important indicator of the magnitude of a country's economy. There are, however, many problems associated with GNP estimation. In December 1953, for example, when the American Economic Association met in Washington, the *Washington Post* asked a group of economists whose job it is to study GNP: "What do you estimate the US gross national product to be for 1953?" The *Post* had to draw a normal distribution curve to get the best guess! Thus, GNP by itself is, at best, an over-all indicator; some of its implications will be discussed below under the heading of the growth of the economy and in comparisons between the West and the East.

The index of industrial production is an important quantitative indicator, for two reasons. The standard method of handling this index is, of course, to take a base year and call that, arbitrarily, 100. Then all other years are related to it to determine whether there has been growth, stability, or retrogression in the capability of a given sector of the economy. There is also a second way to use an index of industrial production. In a given industry with a capacity of 100 for any given time, this index will show at what capacity it is actually operating at one particular moment. This index, furthermore, can

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indicate seasonal operation within industries and thereby make intelligence operations and target analysis that much easier.

Qualitative Analysis: Sovmat Program

To turn now to the tools of qualitative analysis, there are two major points involved. First of all, there are the characteristics of a product the country decides it needs. These characteristics will be the specifications assigned the product. Qualitative analysis will aim at finding out how closely these specifications have been met. This is done, here in the intelligence community, by a program of analysis of foreign materials and equipment produced throughout the world.

In the case of the USSR, we have the Sovmat — or Soviet Materials — Program. We buy all manner of things and have them analyzed for quality by US industry. For example, the first item procured by the Sovmat Program was a can of tuna fish. An unglamorous item, to be sure; but the analysis of the tin, made by a leading US steel company, revealed that the Russians had perfected tin-cladding to a degree as yet unknown in this country. On the basis of that analysis, the steel company undertook a new research program of its own.

There are also, frequently, interesting peripheral benefits from the Sovmat Program. One concerns a bale of yak wool which originated in Sinkiang, crossed the Himalayas, came down through Pakistan, was purchased in Karachi, and was shipped to the US. An analysis was to be made by a major US wool processor. When they opened the bale, they found complete documentation for a person to travel through Sinkiang.

It is possible to generalize on the quality of Russian products in this way: they are utilitarian. There is no excess of decoration. The Russians obviously believe that a train car will get you from Point A to Point B just as quickly without the chrome trim and the fancy seats that Americans seem to like. Russian tanks are extremely formidable, even though they have not buffed off the burrs from the welding seams. Russian guns

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fire just as well even though the projectiles are not machined to the tolerances common in US industry. Quality, that is to say, is strictly an applied matter as far as the Russians are concerned; they maintain quality only to the minimum possible extent consistent with use.

Organization and Growth

The organization of the economy is studied in a number of ways. Input-output tables have already been discussed above. The population curve is one important measure of economic organization because, in developing it, one must also determine what skills are being maintained or improved and what skills are in short supply.

Gross national product is worth mentioning again in this connection. The GNP for 1954 for the Sino-Soviet Bloc is estimated (in 1951 dollars) at 223 billion. The GNP for the NATO community is estimated at 546 billion. The GNP for the USSR is estimated at 123 billion and that for the US, 360 billion. Note the interesting relationship that exists here: within the Soviet Bloc, the USSR accounts for almost the same proportion of the total GNP as does the US in the NATO community. The USSR, that is to say, is the direct US counterpart within its own economic community. The growth rate of the Soviet GNP is now estimated to be of the order of 6 to 6.5 per cent a year and that of the US, 3 to 4 per cent. The US GNP is at present 2.92 times that of the USSR. With present estimated growth rates, therefore, and with the US having a base almost three times that of the USSR, the GNP curves will not intersect in the foreseeable future.

The growth of the economy in any country is analyzed by using much these same techniques — input-output tables, gross national product, index of industrial production, population curves, and, more recently, the index of the standard of living. This last was added at a time when, on 5 August 1953, Malenkov made his famous speech on consumer goods — which was, of course, just so many words. There is no evidence that the

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consumer goods program was ever intended to be implemented, much less that it was ever actually implemented, from analysis of all available materials.

Sources of Information

This completes the survey of the five questions the intelligence community is called on to answer and of the primary methods for determining these answers. Where, then, does the community get the necessary information?

First of all, there are overt sources. One never knows when an industrial publication of, say, the Soviet Ministry of Agriculture may have a great deal of information of interest to people studying ferro-alloys. Design information is commonly given in such publications. Specifications are also frequently given, as well as material which contributes to our understanding of markings. Open journals often publish information on future planned production within a given economic sector. Information from overt sources — like radio broadcasts, newspapers, journals, and books — is, furthermore, often more accurate than information collected by clandestine means. If I am able to make only one point in this discussion, I want it to be this: there is absolutely no relationship between the validity of a bit of information and the classification of the document in which the information appears.

Defectors are another source of information. The intelligence community has been misled, however, and needs always to be chary of this source. It is difficult indeed to establish bona fides. And the method of screening must be greatly improved before defectors can be considered a really major source of information.

Returned POWs are of little value — but mostly because the interrogation system is imperfect. There have been interrogation reports in which an individual, whose POW background indicates he has been a member of a road gang on a Hungarian railroad, was asked as a lead-off question: "What direction do you think the economy of Hungary will take in

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the next five years?" This sort of absurdity has to be eliminated. Fortunately, procedures with both defectors and POWs are being constantly refined.

Commercial contacts within the US are used to analyze materials collected from the Soviet Bloc and other countries. Commercial contacts are used, also, to provide positive intelligence which has been collected by members of commercial organizations as they travel about the world. It is a valuable source of information — not, however, without difficulties because some people who go outside the US and have been contacted by CIA fancy themselves cloak-and-dagger operators and act accordingly.

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US government files — outside the intelligence community — are another fertile source of information, and a source that has not yet been exploited as thoroughly and as completely as it should be. Why is this? Because of sheer, simple bureaucracy — the objection of bureaucrats to making their files available. A major effort just now is directed to the study of gold manipulation by the USSR. There is surely a great deal of information on this subject located in various files around Washington. The Economic Intelligence Committee, which has on its membership list practically every major agency and department in the government, sent out a call for information but, despite hints that it exists somewhere, very little has been forthcoming. This problem, clearly, has to be solved. As a

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last resort, it may be necessary to get a National Security Council Intelligence Directive. It seems strange to me that it should be necessary to have to go to this extreme for authority to get nothing more than intragovernmental collaboration and co-operation on matters of national security.

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The Consumer of Economic Intelligence

The final question is: *who* uses economic intelligence? The Office of National Estimates in CIA has charge of the production of National Intelligence Estimates and, in so doing, tries to get the best thinking of the community on a given subject and to produce an agreed estimate of a situation. These opinions are distilled down — sometimes the expression is “watered” down — so that the President and the NSC can have an overlook of the estimated results of certain courses of action bearing on a policy question. It is the purpose of intelligence to furnish facts to whoever needs them. The need to know is, of course, the overriding factor in the dissemination of intelligence to consumers.

* * *

This has been, then, a summary of economic intelligence in terms of its definition — appraisal of the capability of a country to support a war. *Why* is it prepared? In order to estimate the capabilities, the vulnerabilities, particularly those that are exploitable, and the intentions of the potential friend or

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enemy. *When* is it prepared? On both a long-run and short-run basis. *Where* is it prepared? By the entire community, by all the assets that can be brought to bear on the problem. *How* is it prepared? By all manner of different techniques, all part of the mechanism of successive approximation. *Who* uses it? The national policy-maker.

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NOTES AND COMMENTS

The writer of the following comment is Director of Intelligence, U. S. Air Force.

We in the Air Force intelligence shop have for some time avoided using the words "capabilities" and "intentions" in any of our own work. We prefer to use "strengths," "courses of action which can be undertaken or continued," and then "probable damage to our interests." We consider "psychological strength" as being necessary to any course of action and that some measurement of psychological strength can be made in terms of "motives," "judgments," and "pressures."

There is much in Mr. Abbot Smith's article which coincides with our view. However, I believe our effort is unique in that it attempts to set up *all* causative things as *strengths* and deals with the "net capabilities" problem in terms of "probable damage to our interests."

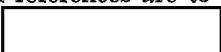
**Major General John A. Samford,
United States Air Force**

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* All references are to "Articles on Capabilities" by Abbot E. Smith
an  *Studies in Intelligence*, January 1956.

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